# Estimating the Cost of a Medicare Outpatient Prescription Drug Benefit

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People enrolled in Medicare account for more than one-third of all outpatient prescription drug expenditures in the United States. That being the case, a proposed prescription drug benefit under the Medicare program would insure a substantial part of the market and would create the largest expansion of the program in the past 20 years. This article explains how the cost of a drug benefit was estimated as part of the Clinton Administration's health reform initiative.

#### INTRODUCTION

Almost one-half of current Medicare enrollees have no third-party insurance for prescription drug coverage. Data from the 1992 Medicare Current Beneficiary Survey (MCBS) show that 37 percent of non-institutionalized enrollees had drug coverage through private insurance, and another 14 percent were covered through public programs (Table 1). Third-party coverage of drug insurance among aged enrollees was skewed toward younger cohorts, who are more likely to have employer-sponsored insurance.

Little is known in aggregate about the depth of existing drug coverage for Medicare enrollees. The National Association of Insurance Commissioners standards for medigap policies include two optional forms of drug insurance. Of the 10 approved plans, Plans H, I, and J cover

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prescription drugs. All 3 have a \$250 deductible and pay 50 percent of the excess; Plans H and I cap the annual benefit at \$1,250 and Plan J caps it at \$3,000. Employer-sponsored retiree benefits may differ from medigap standards, as may other group and individual policies held by Medicare enrollees. No systematic information on the frequency with which enrollees choose one type of plan or another, however, is known to be available, so it is impossible to characterize existing coverage from plan descriptions.

Medicare itself covers few outpatient prescription drugs at present. The supplementary medical insurance (SMI) portion of the program reimbursed about \$25 million in 1993 for immunosuppressive drugs used in the followup care for an approved organ transplant. In addition, SMI paid about \$650 million for erythropoietin, a blood-enhancing agent used pre-operatively for transplant candidates. Beginning in January 1994, the program will cover about \$20 million of oral anticancer drugs each year. However, the bulk of spending for outpatient drugs used by Medicare enrollees is not insured through the program.

There have been a number of proposals to change that coverage. These started as early as original congressional committee discussions, where suggestions to cover homeopathic medications eventually died. In May 1967, President Johnson established a Task Force on Prescription Drugs, specifically to study the inclusion of drugs under Medicare. The final report of the Task Force suggested that Medicare offer

Table 1

Prescription Drug Coverage for Non-Institutionalized Medicare Enrollees, by Eligibility Status and Age: 1992

Eligibility Status and Age	Private Insurance Coverage	Public Program Coverage	No Drug Insurance
· · · · · · · · · · · · · · · · · · ·		Percent	
All Non-Institutionalized Enrollees	37.1	13.9	49.1
Disabled	20.7	39.2	40.1
0-44 Years	12.8	52.9	34.3
45-64 Years	25.1	31.5	43.4
Aged	38.9	11.0	50.1
65-69 Years	45.5	9.5	45.0
70-74 Years	42.6	8.9	48.8
75-79 Years	35.8	11.2	52.9
80-85 Years	31.0	12.7	56.4
85 Years or Over	26.4	18.1	<b>5</b> 5.5

SOURCE: Health Care Financing Administration, Office of the Actuary: Tabulation of data from the Medicare Current Beneficiary Survey, Access to Care Public Use File, 1992.

less than comprehensive coverage (U.S. Department of Health, Education, and Welfare, 1969). Despite several legislative efforts during the 1970s and 1980s, it was not until the Medicare Catastrophic Coverage Act of 1988 (MCCA) that some form of prescription coverage was passed. However, constituent outcry over the financing of the program, coupled with uncertainty over its cost, led Congress to repeal the act the following year before the Catastrophic Drug Insurance (CDI) benefit was implemented.

The coverage currently proposed by the Clinton Administration is both similar to and different from the CDI. Like CDI, prescription drugs and biological products are covered, including insulin; syringes are excluded, as are drugs excluded from coverage through Medicaid; and coverage of home infusion drugs is determined on a drug-by-drug basis. Unlike CDI, which had a \$600 deductible in 1991, the current proposal has a low annual deductible (\$250 in 1996) and limits out-of-pocket spending by a beneficiary (\$1,000 in 1996). Under the current proposal, the Federal Government would receive rebates from manufacturers

for drugs sold to enrollees (including drug sales that go to meet the deductible), and would reimburse pharmacies on the basis of average wholesale price.

The financing of the Clinton proposal is very different from that of MCCA's CDI. The 1988 law established a separate trust fund for prescription drugs, and enrollee premiums were intended to cover the cost of the program completely. The current proposal makes drug coverage part of SMI, although the drug deductible is separate from that for other SMI services. As a result, enrollee premiums would cover roughly 23 percent of the cost of the program, rather than 100 percent.

It is difficult to establish the cost of a sweeping change such as that proposed for a Medicare drug benefit. The paucity of comprehensive data on use and expenditure for drugs by the Medicare population makes the development of a cost estimate for the program extremely challenging. The goal of this article is to describe how the Administration's initial cost estimates were derived. Staff in the Health Care Financing Administration (HCFA) Office of the Actuary (OACT) used four broad steps:

- (1) estimating mean current-law spending;
- (2) estimating mean allowed charges per user and a distribution about that mean; (3) estimating the amount of additional demand created by the insurance benefit itself (the "insurance effect"); and (4) estimating the net costs of the program.

# **CURRENT-LAW SPENDING**

To estimate current-law spending for prescription drugs by the Medicare population, a time-series approach that combined data from several sources was used. The approach is an extension of that used in making cost estimates for MCCA, a complete discussion of which is documented elsewhere (Waldo, 1987; U.S. Department of Health and Human Services, 1989).

A variety of data sources was used to make the CDI estimates. Survey data from the 1967-77 Current Medicare Survey (CMS), 1977 National Medical Care Expenditure Survey, 1980 National Medical Care Use and Expenditure Survey, and 1987 National Medical Expenditure Survey (NMES) provided information on prescriptions per capita and cost per prescription. Drug-mention data—physician reports of drugs prescribed or discussed during patient contacts-from the 1980 and 1985 National Ambulatory Medical Care Survey (NAMCS) and from IMS America's National Diagnostic and Therapeutic Index also were used, as was the Pharmaceutical Data Services, Incorporated "Senior Scripts" data file for 1988, to extend information on prescriptions per user. Data Pennsylvania's **Pharmaceutical** from Assistance Contract for the Elderly (PACE) program provided information on use and expenditures for drugs by institutionalized beneficiaries relative to non-institutionalized (Stuart and Ahern, 1989). Additional price information was provided by the PACE study, the household surveys previously mentioned, and IMS America's National Prescription Audit.

Subsequent to the MCCA estimates, new data have become available and have been brought to bear in estimating the cost of the new proposal. A time series on cost per prescription was provided by Eli Lilly and Company (1967-92). Data on drug mentions from the 1990 and 1991 NAMCS also have been incorporated (Nelson, 1993; National Center for Health Statistics, 1993). Data from the 1992 MCBS on prescriptions per user and user rates were not available in time to prepare the initial cost estimates of the President's proposal, but will be used to refine those estimates.

To project mean expenditure, trend analysis with exogenous assumptions about the overall economy was employed. Prescriptions per user and user rates were extrapolated from the historical trends that had been derived. The President's Council of Economic Advisors provided a projection of consumer inflation (measured by the Consumer Price Index [CPI]) for the period 1994-2005. Based on recent experience and the nature of proposed rebates under the Medicare drug benefit, it was assumed that prescription price growth would be moderate relative to general consumer inflation. The resulting time series of prescriptions per user, user rates, and cost per prescription are shown in Table 2.

## ALLOWED CHARGES

The proposed drug coverage under Medicare does not recognize all retail charges as eligible for reimbursement. The language of the bill restricts payment to 93 percent of average wholesale price (AWP), plus a dispensing fee that begins at \$5 per prescription in 1996 and grows with the CPI.

Table 2
Estimated User Rates and Factors Determining Current-Law Spending per User:
Calendar Years 1996-2000

User Rates and Factors	1996	1997	1998	1999	2000
User Rate in Percent	86.4	86.8	87.2	87.6	88.0
Prescriptions per User	24.5	24.9	25.2	25.6	26.0
Retail Charge per Prescription	\$31.52	\$32.92	\$34.39	\$35.92	\$37.51
Allowed Charge per Prescription	\$29.43	\$30.68	\$31.99	\$33.35	\$34.78
Ratio of Allowed Charge					
to Retail Charge	0.934	0.932	0.930	0.928	0.927
Retail Spending per User	\$771	\$819	\$868	\$920	\$975
Allowed Charges per User	\$720	\$763	\$807	\$854	\$904

NOTE: Figures reflect estimates as of February 1994.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Office of National Health Statistics, 1994.

To convert the current-law mean expenditure from retail charges to allowed charges, a simple (and simplistic) scalar was used. Based on anecdotal evidence, it was assumed that the average retail charge for a prescription was 20 percent higher than the AWP. Estimated cost per prescription was reduced by this ratio and the dispensing fee was added to arrive at an average allowed charge per prescription. Mean expenditures per user were reduced by the ratio of allowed charge per prescription to retail charge per prescription. The ratio increases slowly over time (Table 2) because the dispensing fee is projected to grow more slowly than the current-law retail charge.

The distribution of allowed charges around its mean was estimated from historical data. For the MCCA estimates, a gamma distribution, which has 2 parameters, was used. The parameter b is a shape parameter. Non-linear least-squares fit of interval frequencies for retail charges for each of the years 1967-77 (from the CMS survey) and for 1987 (from the NMES survey) suggest that b is roughly constant over time. As a result, the average value of b from the 1967-77 regressions has been carried forward through time. Values for a, the scale factor, have been determined by

the value of b and the arithmatic mean of the distribution; in this way, the distribution for any given year will be centered on the average expenditure per user.

The assumption that allowed charges are distributed in the same way as retail charges is simplistic but likely harmless. In reality, the translation of retail charge to allowed charge per prescription is not linear. The lower the retail charge for the prescription. the closer it will be to the allowed charge. Thus, people with many small prescription charges will see a smaller reduction to get to allowed charges than those with a few bigticket items. It is difficult to determine theoretically how the distribution of allowed charges would differ from that of retail charges. In the absence of information to the contrary, it has been assumed that the same shape distribution would obtain.

#### INSURANCE EFFECT

It is commonly acknowledged in the insurance industry that the very act of coverage tends to increase demand for the covered good or service, but there is considerable disagreement over the extent of such an effect. The presence of an insurance benefit reduces the cost to the consumer at the time of purchase, and people tend to consume more of something when

its price is lower than they do when it is higher. Further, providers of care are more likely to prescribe drugs, or to prescribe more expensive drugs, when their patient is insured against drug expense. Consequently, the induced demand can arise from either or both sides of the provider-patient relationship. Induced demand can take the form of more prescriptions per capita, higher cost per prescription, or both.

In estimating the cost of the proposed drug insurance program, an induction factor of 1 was used. This means that each dollar of current-law spending transferred from out-of-pocket to third-party coverage increases spending by a dollar. What this factor effectively means is that each dollar of proposed Medicare benefits produces another \$0.60 of total demand. This is because some current-law drug spending by the Medicare population is covered by third parties of one sort or another. Data from NMES show that roughly 60 percent of drug spending by the Medicare population was financed out-of-pocket in 1987 (Table 3). It has been an assumption that roughly the same proportions apply to future current-law years as well, and that 40 percent of the new Medicare benefits would simply replace existing insurance benefits and thus would generate no new demand.

To derive proposed-law allowed charges, an algebraic model of expenditure was applied. Under the proposed policy, enrollees will pay a fraction r (20 percent) of drug expenses in excess of a deductible k (\$250 in 1996). Once the beneficiary has paid a given amount c out of pocket (\$1,000 in 1996), the coinsurance rate drops to s (in the current proposal, s is zero). An induction factor i (0.6) is applied to all benefits to generate an insurance effect. Proposed-law allowed charges equal current-law allowed charges plus the insurance effect.

The algebraic relation between proposed-law and current-law allowed charges for an individual is summarized in Figure 1. In the figure, t is the level of current-law spending that (with the insurance effect), triggers the cap c at spending  $y^*$ :

$$t = \frac{c \cdot k(1-r) \ (1-ri)}{r \ [1+i(1-r)].}$$

# **NET PROGRAM COSTS**

Knowing the algebraic relation between current-law and proposed-law allowed charges and the distribution of current-law allowed charges allows calculation of insurance benefits. A continuance table for current-law allowed charges in each year was

Table 3

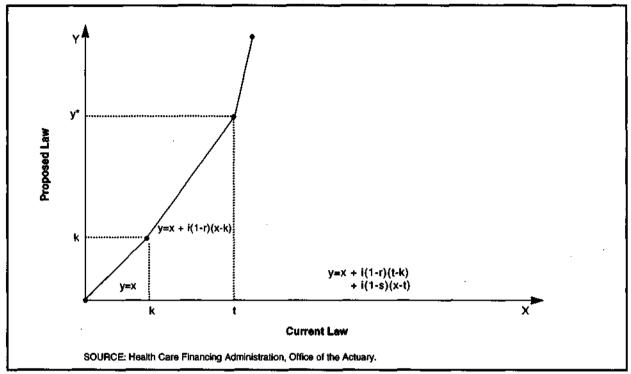
Sources of Funds for Medicare Enrollees' Drug Expenditures, by Type of Enrollee:
Calendar Year 1987

	Enrollees			
Source of Funds	Total	Aged	Disabled	
	Percent Distribution			
All Sources	100.0	100.0	100.0	
Out of Pocket	56.8	63.9	53.1	
Private Insurance	27.8	21.9	31.0	
Medicaid	9.6	8.8	10.0	
Other Federal	4.3	3.5	4.7	
Other State	0.7	1.6	0.3	
Workers Compensation	0.3	0.0	0.5	
Other	0.3	0.2	0.3	
Free From Provider	、 0.1	0.1	0.1	

SOURCE: Health Care Financing Administration, Office of the Actuary: Tabulation of data from the 1987 National Medical Expenditure Survey, 1993.

Figure 1

Algebraic Relationship Between Current-Law and Proposed-Law Allowed Charges for Prescription Drugs



developed, applying a gamma distribution to the estimated user mean, and divided the population into the 4 logical groups: (1) non-users; (2) users who do not meet the deductible; (3) users who meet the deductible but not the out-of-pocket cap; and (4) users who exceed the out-of-pocket cap. The incurred benefits and copayment liabilities of the three latter groups are shown in Table 4.

At the time of this article's preparation, estimates of the cost of administering the proposed drug program were notional only. The exact nature of the administration is not set in the proposed law. Administrative cost estimates developed for CDI have been adopted, based on the assumption that the administration would be similar to that proposed in MCCA. In 1989, the Reagan Administration estimated that electronic claims would account for 90 percent

of all prescriptions and would cost \$0.73 each in 1993. The remaining 10 percent of prescriptions would be filed on paper, averaging 1.5 prescriptions per claim and costing \$1 per claim to administer. This means that the administrative costs per prescription would average \$0.724 in 1993. For the purposes of these cost estimates, that claim figure was increased 3 percent per year through the end of the century. A notional \$100 million per year was also added, to cover fixed costs associated with the drug benefit.

The proposed legislation contains a provision securing two types of rebate from drug manufacturers for products dispensed under the program. The first is a discount rebate equal to at least 17 percent of the average manufacturer's price, applicable to branded products. (For the purposes of initial cost estimates, it was assumed

Table 4
Estimated Allowed Charges, Benefits, and Copayments for Prescription Drugs:
Calendar Years 1996-2000

Allowed Charges, Benefits, and Copayments	1996	1997	1998	1999	2000
All Enrollees				· <del>-</del>	·
Allowed Charges	\$30,156	\$32,491	\$34,915	\$37,481	\$40,226
Benefits	19,244	20,652	22,124	23,687	25,343
Copayments	10,912	11,840	12,790	13,794	14,883
Enrollees Not Meeting					
the Deductible (Including Non-Users)					
Proportion of Enrollees in Percent	41.5	41.6	41.5	41.5	41.5
Allowed Charges	\$1,104	\$1,223	\$1,343	\$1,469	\$1,610
Benefits	0	0	0	0	0
Copayments	1,104	1,223	1,343	1,469	1,610
Enrollees Meeting the Deductible but Not the Ćap					
Proportion of Enrollees in Percent	56.2	56.2	56.2	56.2	56.2
Allowed Charges	\$24,738	\$26,641	\$28,623	\$30,702	\$32,933
Benefits	15,745	16,902	18,117	19,389	20,747
Copayments	8,994	9,739	10,505	11,313	12,186
Enrollees Meeting the Cap					
Proportion of Enrollees in Percent	2.3	2.3	2.3	2.3	2.3
Allowed Charges	\$4,314	\$4,627	\$4,949	\$5,310	\$5,683
Benefits	3,499	3,749	4,007	4,298	4,596
Copayments	815	877	942	1,012	1,087

NOTE: Figures reflect estimates as of February 1994. All dollar amounts are on an incurred basis in millions.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Office of National Health Statistics, 1994.

that the discount would be exactly 17 percent.) There is also a penalty rebate that recovers from manufacturers any revenues attributable to Medicare enrollees and generated by price increases in excess of the CPI growth.

The discount rebate applies to the ingredient cost of the prescription. Pharmacy gross profit is about 27 percent. This means that the drug cost itself is about 73 percent of the prescription price (Schondelmeyer, 1993). A further reduction is needed to reflect gross wholesaler profits, which were about 7 percent in the late 1980s (National Wholesale Druggist Association, 1990). Thus, manufacturers' revenues should be about 93 percent of 73 percent—68 percent—of retail spending. It has been assumed that the rebate would apply to three-quarters of those revenues-the proportion of Medicaid drug spending that is for branded products.

A notional allowance has been made for the penalty rebate called for in the proposed legislation. The actual rebate is calculated on a drug-by-drug basis, but sufficient information to make such a detailed calculation is not available. It is clear that the actual rebate would depend greatly on future pricing decisions by manufacturers. A penalty rebate was estimated based on average projected price increases. The effect upon the program is negligible, because the intent of the rebate is to recover benefits generated in excess of a normative increase.

Enrollee premiums take two forms in the proposed program. Flat premiums are assumed to support 25 percent of program costs (including administration and net of rebates) for aged enrollees. (Because disabled enrollees pay the same premium but use more services, the actual proportion of program costs accounted for by monthly

Table 5
Estimated Outlays and Income of the Proposed Drug Program: Calendar Years 1996-2000

Outlays and Income	1996	1997	1998	1999	2000
	In Millions of Dollars				
Total Program Cost	\$17,579	\$18,698	\$19,997	\$21,374	\$22,830
Benefits	19,244	20,652	22,124	23,687	25,343
Administration	911	963	1,016	1,071	1,129
Rebate Discount	2,575	2,764	2,979	3,208	3,454
Rebate Penalty	0	153	164	176	188
Total Income	4,067	4,212	4,491	4,723	5,052
Monthly Premiums	3,968	4,109	4,381	4,607	4,930
Net Cost to Federal Government	13,512	14,486	15,506	16,651	17,778

NOTE: Figures reflect estimates as of February 1994.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Office of National Health Statistics, 1994.

premiums is less than 25 percent.) In addition to monthly premiums, supplemental premiums are assumed to be levied on enrollees in the upper end of the income distribution. The remainder of the incurred costs of the program are financed through general revenue. Estimated calendar year incurred revenues and expenses are shown in Table 5.

## DISCUSSION

Any cost estimates associated with a program change as sweeping as the one proposed for prescription drugs are subject to considerable uncertainty. It is important to recognize the sources of this uncertainty so that adequate allowance can be made in the financing of the program.

The data used to make these estimates have inherent limitations. Household survey data produce reliable information relating spending with sociodemographic and economic factors, but they also reflect errors of recall and omission on the part of respondents (Berk, Schur, and Mohr, 1990, 1991; Moeller and Mathiowetz, 1991).

The data used to construct the historical trend in spending tend to be oblique, fragmentary, and old. Through use of as many data sources as possible, the possibility of error in the estimates has been minimized, but the potential for such error must be recognized.

Massive changes in a marketplace such as those suggested by the proposed program will lead to unforeseeable changes in behavior by the various players. For example, the evidence on the size of insurance effects is not altogether clear, and the effect of induced demand upon aggregate spending will only be revealed as the program is implemented. The nature of drug products is likely to continue to evolve, with new drugs introduced to treat geriatric conditions. Current patents will expire, producing new markets for generic drugs, and the price differentials between brand-name and generic drugs may change. Use of drugs by the disabled population may change, especially for those enrollees with immune disorders and transplanted organs. Any acceleration (or deceleration) of these factors would change the trend in spending per user, a critical factor in our estimates.

The major sensitivity of the estimates lies in the potential error surrounding the mean of the user spending distribution.

Single enrollees whose income exceeds \$105,000, and married enrollees whose combined income exceeds \$130,000, would pay premiums equal to 75 percent of the average program cost. Single enrollees with incomes between \$90,000 and \$105,000, and married enrollees with combined incomes between \$115,000 and \$130,000, would pay premiums ranging from 25 percent to 75 percent of the average program cost on a sliding scale.

Table 6
Sensitivity of Benefit Levels to Error in Mean Spending

Case	User Mean Spending as a Percent Deviation From Base Case	Program Benefits as a Percent Deviation From Base Case	Ratio
Test Case 1	-20.0	-26.9	1.35
Test Case 2	-10.0	-13.7	1.37
Test Case 3	-5.1	-7.0	1.37
Base Case	0	0	_
Test Case 4	+4.8	+6.7	1.39
Test Case 5	+10.0	+14.0	1.40
Test Case 6	+20.0	+28.2	1.41

NOTE: In this exercise, the base case has a user mean of \$765; program parameters include a deductible of \$250, coinsurance rate of 20 percent, and copayment cap of \$1,000.

SOURCE: Health Care Financing Administration, Office of the Actuary: Data from the Office of National Health Statistics, 1994.

Because the deductible would be set by statute and applied to a skew distribution, any error in estimating the mean of the distribution would be magnified in the size of the benefit. To demonstrate this, the benefits associated with a \$250 deductible have been simulated using various means of a distribution of allowed charges. The results are shown in Table 6. In the relevant range, a 1-percent error in estimating the user mean expenditure results in a 1.4-percent error in the estimated level of benefits.

## CONCLUSION

Coverage of prescription drugs by Medicare presents a potentially significant increase in the size of the program. The drug benefit could generate as many as a billion new claims each year, and could encumber some \$78 billion between now and the end of the century. The Administration's method of estimating the cost of the program has been shown, and potential significant real cost variations have been explored. The challenge is to develop a premium that safely incorporates the uncertainty of such a massive new benefit without harming financially the population it intends to protect.

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